



Work related eye injuries: Epidemiology in a tertiary care eye hospital of South India

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Abstract

Background: Work related eye injuries are one of the common causes for preventable vision loss. The aim of the study was to analyse the epidemiological characteristics of work related eye injury in a tertiary care eye hospital in South India.

Methodology: This prospective observational study included all patients who reported to ophthalmic outpatient department with work related eye injury during the study period.

Results: Out of the 416 patients, majority were males. The injuries were common in younger age group. Metal welding and grinding, and agriculture were the high risk occupations for work related eye injuries. Corneal foreign body was the most common type of eye injury noted. Most of the patients were not using protective eye gear at the time of injury. About 7.2% of the patients had previous history of eye injury at work place.

Conclusion: As work related eye injury is common in younger age group early intervention is required in order to avoid permanent visual impairment. Specific interventional programmes should be considered as these workers are prone for recurrent eye injuries. There is a need for more effective preventive measures, especially in metal work, agriculture and carpentry, where increased frequency and worst prognoses of injuries were observed.

Keywords: eye injuries; preventable; visual disability; protective eye gear

Introduction

Eye injuries form an important part of work related injuries. Work related eye injuries pose a significant socioeconomic impact by causing suffering and loss of working days, and by reducing the work ability and quality of life [1-4]. The reluctance of these eye injured workers to adopt precautionary measures lead to recurrent eye injuries [5]. Recurrent eye injuries increase the risk of permanent visual disability.

The incidence and severity of work related eye injuries is higher in developing countries like India as occupational health and workplace safety are not given importance [6]. In a study conducted on ocular trauma by Prakash et al., from our institute, work related eye injuries constitute 22% of all ocular trauma [7]. These injuries are more common in unorganized sectors like small grinding, welding or fabrication enterprises than in organized setup like factories. These unorganized

sectors do not provide safety training and they do not mandate the wear of eye protection devices to the workers [8, 9]. Most of these eye injuries are preventable with development of effective and stringent preventive measures [10, 11]. In order to develop these preventive measures thorough knowledge of the risk factors, nature of injuries, occupation at risk is required [5]. However

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Received 2 March 2023; Revised 8 June 2023; Accepted 16 June 2023; Published 26 June 2023

Citation: Hegde SS, Dharwadkar S, Hegde SS, Sukumar P. Work related eye injuries: Epidemiology in a tertiary care eye hospital of South India. J Med Sci Res. 2023; 11(3):194-197. DOI: <http://dx.doi.org/10.17727/JMSR.2023/11-36>

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there is a paucity of these data in India due to lack of reporting and surveillance system [12, 13].

This study was done to analyse the demographic and clinical data of patients with work related eye injuries and utilize these data to formulate preventive measures.

Methodology

The study was conducted according to the principles of the Declaration of Helsinki, and the study protocol was approved by the institutional ethical committee. Work related eye injury was defined as an eye injury that occurred as a direct result of the work done or the conditions in the workplace [14]. All work related eye injury cases which presented to the outpatient department of our hospital between February 2022 and January 2023 were included in the study. Relevant demographic and occupational data was collected. All the patients were subjected to a complete ophthalmic examination.

Statistical analysis

All data obtained in the study were recorded in and analyzed using the Statistical Package for Social Sciences for Windows, Version 17. Numerical variables were given as mean and standard deviation (SD), while categorical variables were given as frequencies (n) and percentages.

Results

Out of the 416 patients included in the study majority were males (n= 393, 94.4%) (Figure 1). The eye injuries were more common in younger workers with most of the injured workers being in the age group of 21 – 30 years (n=245, 59%) (Figure 2). The work related eye injuries

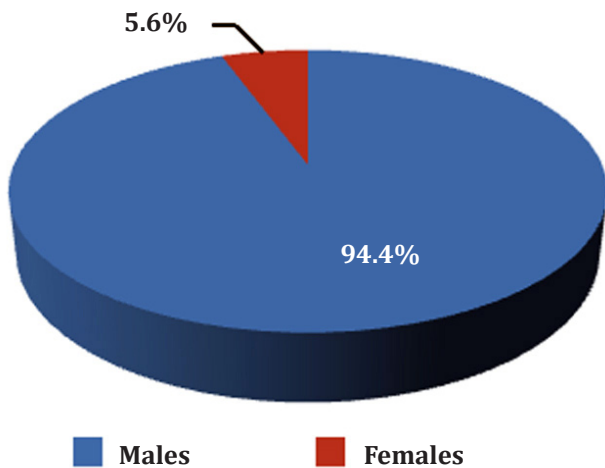


Figure 1: Gender distribution of patients with work related eye injuries.

were more common among workers involved in metal grinding and welding followed by agricultural work (Table 1). Most of the injuries were unilateral (n=374, 89.9%). Those that had both eyes involved were due to chemical injury. The most common type of eye injury noted was corneal foreign body due to metal grinding and welding (n=270, 64.9%) (Table 2). Previous history of eye injury at work place was recorded in 7.2% of the patients. This shows the reluctance of these eye injured workers to adopt precautionary measures in spite of recurrent eye injuries. Workers engaged in metal work were more likely to get recurrent injuries.

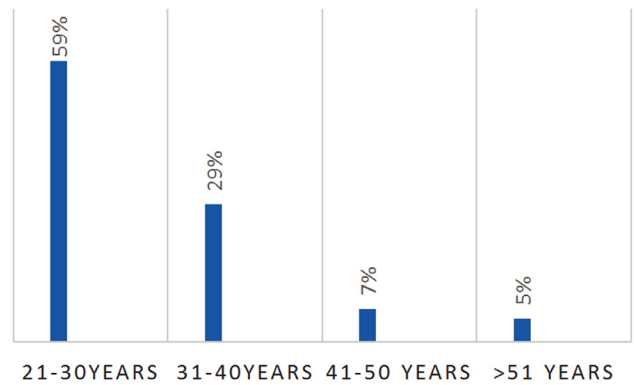


Figure 2: Age distribution of patients with work related eye injuries.

Table 1: Occupation of patients with work related eye injuries.

Occupation	Percentage (Number)
Arc-welding and grinding	74.2 (309)
Agriculture	14.6 (61)
Construction	5.1 (21)
Others	6.1 (25)

Table 2: Type of work related eye injury.

Type of eye injury	Percentage (Number)
Contusion of the eye and adnexa	8.2 (34)
laceration of the lid	3.5 (15)
Corneal foreign body	72.8 (303)
Chemical injury	10.2 (42)
Open globe injury	3.2 (13)
Others	2.1 (9)

Protective eye gear was not used by 90% of the patients at the time of injury (n=374) (Figure 3). Among them, 62.1% had access to it. Patients who suffered from eye injuries due to metal welding complained of difficulty of working with protective eye gear provided due to poor visibility through the eye gear. Surgical intervention was required in 6.7% (n=28). The most common work

related eye injury requiring surgical intervention was open globe injury. It was mostly seen in carpenters. Permanent visual impairment resulting from WREI were documented in 7.9% (n=33).

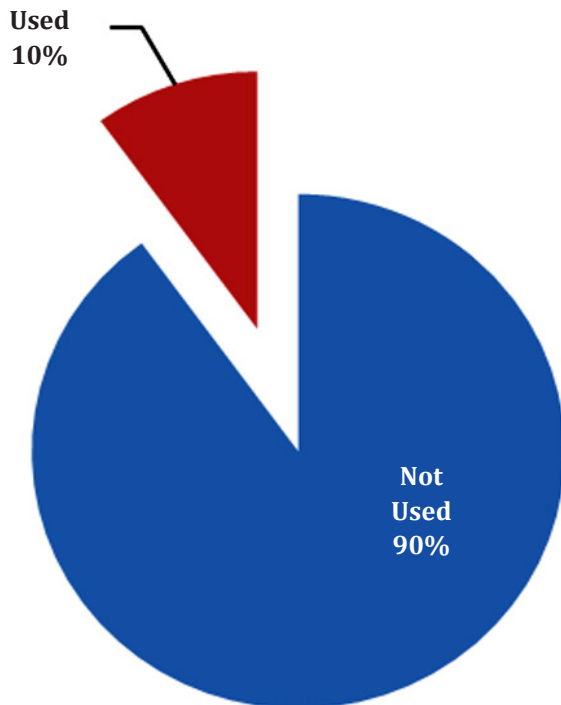


Figure 3: Use of protective eye gear by the patients with work related eye injuries.

Discussion

This prospective hospital based observational study was done to analyse the demographic data, nature and characteristics of work related eye injuries and its risk factors. Similar to the other studies on work related eye injuries majority of patients were males [14-16]. Forrest and Cali in their study on epidemiology of lifetime work related eye injuries in the US population found that men are four times at higher risk of eye injury at workplace as compared to women [17]. This can be explained by the fact that traditionally male workers are involved in high risk activities [5].

The injury was unilateral in most of the cases. This is in agreement with the other studies [18-20]. Most of the injuries occurred in younger age group suggesting that inadequate work experience may have a role in these eye injuries [5]. This was in concordance with the results from another study conducted in South India on industrial eye injuries [20]. Gobba et al., found that risk of exposure to WREI is inversely proportional to the job experience and age of the workers [5]. Studies from Turkey, United states, Italy, Ethiopia, Japan and Nepal supported this hypothesis [2, 6, 10, 18, 21]. However, in the studies conducted in eastern and northern India,

majority of patients with occupational ocular trauma were in the older age group (36 to 45 years) suggesting that the work experience did not help to reduce eye injuries [1, 12]. Similar results were reported among workers in China and Taiwan [4, 16].

Certain type of work is associated with higher risk of eye injuries. In our study metal welding and grinding was the most common work leading to eye injury followed by agriculture. This is in concordance with few studies [2-6, 15]. However some studies found that construction workers were more susceptible to work related eye injuries [3,4,12,14,16]. This discrepancy is due to the variation in the occupations in different regions [1].

Metallic corneal foreign body was the most common type of eye injury. It was common in welding and grinding workers and carpenters. Ramakrishnan t et al found that corneal foreign bodies are common among metal grinding workers in Australia [22]. Similar results were obtained from studies conducted in northern and north eastern India [1, 12]. Many studies from Europe and Asia also had similar results [3,5,6,15,16,18].

Previous history of eye injury at work place was noted in 7.2%. All these patients were engaged in metal work. Gabba et al., recorded recurrent eye injuries in 4% of the workers and it was common in workers from metal working sector [5]. Few other studies have recorded previous eye injuries at work place (24-34%) in their study subjects [2,6,15,17]. These results suggest that these eye injuries are not acknowledged enough by the workers and the company to promote adoption of precautionary measures [5, 6].

Previous studies suggest that 90% of the work related eye injuries are preventable [3,5,6,10,12, 23]. Protective gear advisable vary depending on the occupation and may include safety glasses with impact resistant frames and shatter proof lenses mainly for work with flying particles or the larger tight fitting goggles which can prevent liquid splash or airborne spread as well. These need to be used with face shields or welding specific shields or helmets which provide additional filter for the eyes and face against high heat. Use of appropriate protective eyewear with good visibility and most importantly strict compliance on their use can largely prevent work related eye injuries [3, 6]. In our study 90% of the patients were not wearing protective eye gear at the time of injury. Interestingly about 2/3 of these patients did not wear protective eye gear despite having access to it. This number is higher than the results from the previous studies [6, 14]. Most of the other studies have found that more than 90% of the workers did not wear protective eye gear at the time

of injury [1,3,6,14,16,19,24]. In the study conducted in Eastern India majority of the workers 88.3% were not wearing protective glasses at the time of accident [12]. Similar result was noted in the study from South India [20]. A study in Taiwan indicated that eye protection devices could reduce the risk of work-related eye injury by up to 60% [24]. Mengistu et al., found that workers who did not use an eye safety device were 7 times more likely to get eye injuries than those who wore the eye safety device [2]. Many studies have found that although many workers who had the knowledge about and access to protective eye gear did not wear it due to its ill fit, poor visibility through the eye gear and the discomfort caused [1,14,15,25]. In our study patients who suffered from eye injuries due to metal welding complained of difficulty of working with protective eye gear provided due to poor visibility through the eye gear. Hence effective, well fitting, durable eye gear with good visibility should be provided to the workers in order to improve the compliance of the workers [6, 14, 15].

Small percentage of work-related eye injury occurred despite wearing protective eye gear. This raises question about the efficacy of the protective eye gear provided. Surgical intervention was necessary in 6.7%. Permanent visual impairment was noted in 7.9%. Similar observations were made in previous studies [3, 6, 19].

Limitations: A larger population based study of longer duration would help understand the demographic profile better. We did not study the employment pattern of the workers as temporary and permanent because they mainly belonged to unorganized sectors like welders, carpenters, painters etc., unlike large factories. This is important because temporary workers have less work experience and no safety training thus making them more prone for eye injuries. Yet this study can serve as baseline data for further studies to generate inputs for the policymakers to design evidence-based interventions to reduce the visual morbidity and economic loss due to work related eye injuries.

Conclusion

The study provides an insight into the epidemiological characteristics of work related eye injuries in Southern India. As frequency of work related eye injury is more in younger age group early intervention is required in order to avoid permanent visual impairment. Most of these injuries can be prevented by use of appropriate eye gear and safety training. While planning the preventive strategies priority should be given to workers involved in metal work, agriculture and carpentry in whom increased frequency and worst prognoses of injuries were observed. Specific interventional programme for

eye injured workers should be considered as most of these workers are prone for recurrent injuries.

Conflicts of interest

Authors declare no conflicts of interest.

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